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**Ashgrove Cement Company
Fender Pile Replacement
3801 E Marginal Way South, Seattle, WA 98134-1147
USACE # _____**

**Best Management Practices
For Pile Removal & Driving & Disposal of Construction Debris
May 4, 2004**

The purpose of the following Best Management Practices (BMPs) is to control turbidity and sediments reentering the water column during pile removal, describe pile driving procedures and proscribe debris capture and disposal of removed piles and debris.

BMP 1. Pile removal

- A. All work shall be done from adjacent pier or work barge. If a barge is used it shall not be allowed to ground out.
- B. Pulling is the preferred method of pile removal.
 - 1) Crane operator shall be trained to remove pile slowly. This will minimize turbidity in the water column as well as sediment disturbance.
 - 2) Operator to "Wake up" pile to break up bond with soil.
 - Pull or hit with hammer or vibrate to break the skin friction bond between pile and soil.
 - Bond breaking avoids pulling out a large block of soil - possibly breaking off the pile in the process.
 - Usually there is little or no sediment attached to the skin of the pile during withdrawal. In some cases material may be attached to the pile tip, in line with the pile.
 - 3) Work surface on barge deck or pier shall include a containment basin for pile and any sediment removed during pulling.
 - 4) Basin may be constructed of durable plastic sheeting with sidewalls supported by hay bales or support structure.
 - 5) Work surface on barge deck and adjacent pier shall be cleaned by disposing of sediment or other residues along with cut off piling as described in BMP #2.C below.
 - 6) Containment basin shall be removed and disposed in accordance with BMP 2.C below or in another manner complying with applicable federal and state regulations.



A. Pile cut off is an acceptable alternative if pulling is not feasible.

- 1) Pile cutoff shall occur at lowest practical tide condition and at slack water. This is intended to reduce turbidity due to reduced flow and short water column through which pile must be withdrawn.
- 2) Pile shall be cut off pile approximately 1.5 feet above mudline using pneumatic underwater chainsaw.
- 3) After cut off, the remaining pile tip shall be driven to a pile cutoff elevation at least 4 feet below existing mudline.
- 4) Use a normal pile driving mandril and vibratory hammer.
- 5) The hole shall be filled with clean sand using tremie hose below a hopper.

BMP 2. Disposal of piling, sediment and construction residue

- A. Pulled pile shall be placed in containment basin to capture any adhering sediment. This should be done immediately after the pile is initially removed from the water.
- 1) Utilize basin set up on the barge deck or adjacent pier
 - 2) Basin may be made of hay bales and durable plastic sheeting.
- B. Piling shall be cut into 4' lengths with standard chainsaw after mud has dried.
- C. Cut up piling, sediments, construction residue and plastic sheeting from containment basin shall be packed into container. For disposal, ship to Rabanco/Seattle, Weyco facility at Longview Washington, or to another facility complying with federal and state regulations.

BMP 3. Pile replacement

- A. Pile material shall be painted or unpainted steel pipe.
- B. Vibratory pile hammer shall be used to drive piles. Work may be done from floating or land based construction equipment.
- C. Piling shall be placed in the same general location as the pile being replaced.

BMP 4. Sound attenuation

- A. Use of vibratory pile hammer.

BMP 5. Debris capture in water

- A. Work shall be done at lowest feasible water level at slack tide or when current velocity is low.
- B. Floating surface boom shall be installed to capture floating surface debris. Debris to be collected and disposed of along with cut off piling as described in BMP #2.C above.

BMP 6. Resuspension/Turbidity

- A. Crane operator shall be trained to remove pile from sediment slowly.
- B. Work shall be done in low water and low current.
- C. Pulled piles shall be placed in a containment facility.
- D. Sediments spilled on work surfaces shall be contained and disposed of with the pile debris at permitted upland disposal site.